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COOPERATIVE EXTENSION WORK IN AGRICULTURE
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United States Department of Agriculture and State
Agricultural Colleges Cooperating

BERRY CULTURE



A red raspberry planted and trained according to the hill system.
The plant has several canes which are tied to a single stake.

Office of Extension Work South
States Relations Service

BERRY CULTURE

SOME of the native berries found in the South lend themselves readily to cultivation. The dewberry and blackberry will repay the care bestowed on them when grown under good cultural conditions in the garden. By a proper selection of varieties the season of fruiting may be extended over a long period. The berries from cultivated vines are more easily gathered than the wild ones, for pruning and training keep the branches up from the ground.

The various varieties of raspberries are also easily grown and yield abundantly. There is a good market for raspberries, dewberries, and blackberries, and, both because of their flavor and because they ripen at a season of the year when fresh fruits are scarce, they are very much appreciated. The jams and jellies are also excellent.

The variety of attractive uses for such berries makes them very suitable for planting in club gardens. Girls who have had one or two years' experience in garden work are planting berries on their tenth-acre plots and by this means establishing profitable and interesting perennial gardens. These advanced club members may find recipes for special berry products in Farmers' Bulletin 853, Home Canning of Fruits and Vegetables.

This circular furnishes directions for the selection of varieties and correct cultivation, and describes methods of pruning and training the plants so as to insure a satisfactory yield.

Further information on the growing of berries may be found in Farmers' Bulletins 643, Blackberry Culture; 728, Dewberry Culture, and 887, Raspberry Culture.

BERRY CULTURE.

THERE is a fine opportunity in many States for profitable and interesting work in berry culture. For this reason, a limited number of club members who have already had successful experience with tomatoes may be selected to demonstrate what can be done with berries. They should begin now to get ready for the crop, year after next, and during the first season they may raise a crop of vegetables between the rows of berry plants. We are indebted to Mr. George M. Darrow, of the Bureau of Plant Industry, for the directions which follow.

Club members who plant a tenth acre of berries may report in daily record book, B-511-I.

BLACKBERRY GROWING.

Blackberry growing is altogether different from any former work done by the canning-club members even though it is growing a plant. The blackberry is a plant having a root that lives for many years but a top which lives only two years. What is called a cane grows up from the root in the spring. It grows throughout the summer and lives through the winter following. The second spring a number of branches grow out from the cane which started the year before and on these the blossoms appear and berries are borne. Soon after the berries are picked the cane will die. But this second year other canes have started up from the root of the plant, and the next year these will bear the berries. These same plants will live and bear berries for many years if managed each year as carefully as the tomato.

Because wild blackberries are so plentiful through your section, many of you will wonder why you should raise them. Many of the cultivated varieties, however, grow larger than the wild ones. Their quality is better and the plants produce more berries. Also, by a proper selection of the cultivated varieties, you may have blackberries to eat before the first wild ones are ripe and after the last ones have gone. The cultivated varieties have firmer berries which keep longer after picking, and so stand shipping to the markets better than the wild ones. For this reason they make better canning stock.

Selection and preparation of soil.—Select one-tenth of an acre of ground for your blackberry field. The soil should be a fine sandy loam. Avoid, if possible, heavy clay soil, coarse sandy soil, and all soils with water standing on them at any time. Just as good berries can be secured from clay or coarse sandy soils, but it takes more work to manage blackberries on them. The best soil is a very deep one with no hardpan. Just as the largest and sweetest wild blackberries are found growing on a soil with the most decaying leaves and with plenty of moisture at the time the berries ripen, so the best berries will be grown on soil as nearly like it as possible in these respects. The tenth acre should have had a hoed crop raised on it the year previous to its use for blackberries for best results.

Plow the soil as early in the spring as is possible and apply two wagonloads of well-rotted stable manure. Harrow this in. This manure gives the plants food to grow on, and helps to make the soil more like the woods' soil.

Varieties to plant.—The best variety of blackberry to plant is the Eldorado. It does not have the rust disease, which is very harmful to certain varieties of blackberries, and is good both for selling fresh and for canning. The Lucretia dewberry should be grown if fruit is desired which is earlier than the Eldorado blackberry. The dewberry will also be better to plant than the blackberry in those parts of all Southern States where the elevation is less than 300 to 400 feet.

Selection of plants.—If possible, secure your plants from a neighbor who will sell you good plants of the true Eldorado variety, otherwise order the plants of a reliable nursery. Keep a copy of your letter for reference. When you get the plants the tops will probably be cut off about 6 inches in length. If the tops have not been so cut, do it at once. Examine the roots to see if there are any plants with large warty or knot-like growths along the roots. If you find any, burn such plants, as this is the "crown gall" disease and it will make the plants unproductive.

Planting.—The plants should be set permanently as soon as received, or "heeled in" if they can not be set at once. To do this dig a trench in a well-drained, and if possible a shaded place, large enough to take in the roots.

Then separate the plants, if they were tied in bundles when received, place the roots of each plant in the trench, and pack the soil firmly about them. The plants should be put as close together in the trench as possible. The way in which this is done is suggested in figure 1. The plants as they are put in the trench may be placed in an inclined position rather than an upright one, as when planting permanently. Handled in this way they can be held in good condition for some time awaiting suitable conditions for permanent planting. If the soil becomes too dry, the plants should be watered.

The plants should be set permanently 3 feet apart in rows which are 8 feet apart. You will need 180 plants to set one-tenth of an acre. A piece of ground 32 feet wide by 136 feet long will give this area.

Set the plants just as early in the spring as it is possible to have the ground plowed and harrowed. Set them just as they formerly grew in the ground.

Cultivation.—The blackberry plots should be thoroughly cultivated all through the growing season. They should have about the same attention in this respect that tomatoes and other vegetables which you have grown have received.

Fertilizers.—As already stated, the best soil for blackberries is a fine sandy loam, and the best wild berries are found where there is much leaf mold on the ground and where there is plenty of moisture for the growth of large berries. If the plants are set early in the spring



FIG. 1.—Cuthbert raspberry plants heeled in. They may be held in this manner for a considerable period in good condition, awaiting permanent planting.

on land which has had two good loads of manure, it will need no more fertilizer for the first year. The size of the crop the next year depends upon how well the plants grow this year, so you can not afford to neglect to put on the manure. After the first year it may or may not pay to use commercial fertilizers on blackberry plants. Soils differ so widely in character that the need for fertilizer can best be determined by trial in each case.

This may be done in a simple way by putting some nitrogen on 45 plants, some potash on 45 others, some phosphoric acid on 45 others, and all three plant foods on 45 others. After two years' trial it will be possible to tell which of these plant foods, including the combination, is giving the best results. Nitrogen makes the canes grow vigorously, while phosphoric acid and potash help in other ways. Stable manure can be used each year and will always help.

Intercrops.—During this first summer the blackberries will not occupy all of the ground. This tenth acre must be cultivated through the summer. Tomatoes, beans, or some other vegetable can be grown between the rows. The berry rows are 8 feet apart and at least one row of tomatoes or beans can be grown in this space. When the tomatoes or beans, which are called intercrops, are hoed and cultivated, the blackberry plants are also hoed and cultivated. This cultivation must start soon after the blackberry plants are set.

If no crops are planted between the rows the field should be cultivated about once in ten days to keep all weeds out and to provide a dust mulch on the surface of the ground to keep all the moisture in the soil. In the fall, unless it is very dry, the cultivation need not be so frequent.

Training.—Blackberry plants have the peculiar habit of sending up new plants from their roots. Thus unless these new plants are destroyed, by the second year the whole field will be almost a solid mass of blackberry bushes. These plants that come up from the roots we call "suckers." If these suckers are dug up and reset in rows, new plants can be grown. This is the usual method of obtaining new plants. If more plants are desired, some of the suckers should be allowed to grow between the plants in the row until they are desired for planting in the spring. New plants may also be grown from root-cuttings. Root-cuttings are made by digging up in the fall, or very early in the spring, blackberry roots which are at least one-fourth of an inch in diameter, and after cutting them into pieces 4 inches long they are buried in the ground. At the end of the summer strong plants which have good root systems will have grown from the cuttings. The suckers between the rows must all be destroyed unless needed for propagation, for they will make too many plants on the land where there are already enough. If the suckers are pulled out they will not grow up again as quickly as if they are cut, but it takes more work. During the summer each plant which you set will send up three or four canes and on these will be borne the fruit the next season. By fall these canes should all be four or five feet long and will bend over on your intercrop. You will find that they will get in the way. When they have a crop of berries they will bend over even more. For this reason, before the plants start growing in the spring, set posts in the ground every 20 feet in the row and string a wire along the row of posts 3½ feet above the ground. (See fig. 2.) Then tie each cane to the wire, spreading the canes fan-shape along it. If it is im-



FIG. 2.—Blackberry canes of the upright type tied to a single wire.

possible to secure the posts and the wire, you can cut the canes off at about $2\frac{1}{2}$ feet above the ground, or better, pinch off the ends of the canes as soon as they grow as high as $2\frac{1}{2}$ feet above the ground. This will make the plants



FIG. 3.—Blackberry canes of the upright type tied to posts.

stockier and better able to hold up a crop of berries, but it is not so good as the former way.

The plants may also be set in hills 5 or more feet apart each way, and the canes pinched back at a height of about 3 feet in order to make a stocky growth. Frequently, when the plants are set in hills,

a post is set by each plant and the canes tied to it. (See fig. 3.) Trailing varieties, except the Mammoth, are rarely trained to the hill system.

Diseases.—The “crown-gall” disease is found in most sections of the country, but if there are no wild blackberry plants on the land which have these knots or warts on their roots, and if plants which have none are set there will probably be no trouble from the disease. If these knots are found on the plants in large numbers and widely distributed, a new plantation had better be started in a new location and with plants free from the disease.

The “rust” or “orange-rust” disease does not attack the Eldorado variety seriously. The Early Harvest and many other varieties are frequently badly injured by it. It may be controlled, however, if every plant which has the disease is dug up, root and all, and burned. The disease can not be recognized until it turns a bright orange color and shows on the under side of the leaves. Then the spores of the disease which take the place of seeds are present by the thousands, ready to infect other plants. After some practice the disease can be recognized before the spores are ripe and the affected plants can then be burned.

Another disease which causes some trouble at times is “anthracnose.” This makes blotches on the canes, but is prevented from doing harm if, after all the berries have been picked from the fruiting canes, these canes are at once cut out and burned.

DEWBERRY GROWING.

Difference between dewberries and blackberries.—You were told that the blackberry has a root that lives many years and canes that live two years. The dewberry has a similar root and top. The canes of the dewberry, however, are smaller and do not grow erect but run or trail on the ground. The dewberry does not have “suckers” but the tip of each cane may root and form a new plant, or, if the places where the leaves appear on the canes are covered with dirt, roots are formed and new plants start from these places. (See fig. 4.)

Value of dewberries.—The berries are very similar to blackberries but are very large. It may be asked, “why grow dewberries at all?” For this reason: Dewberries ripen much earlier than blackberries, earlier even than the Early Harvest blackberry and bear very heavily. To supply a market with fresh berries for a long season, plant some dewberries. The Lucretia is the best variety of dewberry and is usually better to plant than the blackberry in all parts of the South where the elevation is not more than 300 to 400 feet.



FIG. 4.—Tip-rooted Lucretia dewberry plants ready to be set.



FIG. 5.—A field of Lucretia dewberries in North Carolina the next season after planting. The plants are trained to stakes by winding the canes about them and tying as may be necessary to hold them in place.

Culture.—The directions for growing the dewberry are the same as for the blackberry, except that on the lighter sandy soils the dewberry grows better than the blackberry, for it is very deep rooted. The dewberry is usually grown in hills 5 feet apart each way. This allows 176 plants to a tenth acre. Stakes 5 to 6 feet high are set by each hill in the spring when the plants are one year old, and the canes are wound about and tied to the stakes as they grow. (See fig. 5.) Never allow the canes to remain on the ground, for then it is hard to cultivate and pick the fruit, and they do not bear as well nor ripen as early as when trained to stakes.

After the berries are picked, all the canes, both those which have borne fruit and the new canes, are cut off just as near the ground as possible and all should be burned. Then cultivate the ground thoroughly until the new canes begin to get in the way. These new canes are left on the ground until the following spring, when they are tied to the posts. All the diseases and insects on the dewberry are burned when the canes are cut out and burned. The canes should not be cut off if the ground is very dry. Wait until a rain comes.

Extra care for the model tenth acre of berries.—There are certain practices which some may use on their tenth acres but which all can not use because of local conditions.

If tomatoes are not grown between your rows of blackberries, cowpeas or soy beans or some other plant called a legume which grows best in the section can be grown. This group of plants improves the soil in which they grow, and if these plants are plowed into the ground much humus will be added to the soil.

Forest leaves are sometimes spread on the blackberry field. They not only furnish a mulch and add humus to the soil but keep weeds from growing and keep the berries clean. Straw, wild grass, and even clover are sometimes used for this purpose.

If a commercial fertilizer is used it should not contain too much nitrogen as nitrogen has a tendency to cause the plants to produce a heavy growth of leaves and little fruit. Stable manure should always be used instead of commercial fertilizer if it is not more expensive.

In some places posts for the dewberries may be very expensive. In such cases you can make a wire trellis just as described for the blackberry, only have the wire $2\frac{1}{2}$ feet above the ground. The canes can be tied along this wire at the same time as when posts are used alone. If the soil is very rich and the dewberry canes grow very vigorously, it may be better to have the posts higher and have two wires, one 3 feet high and the other 5 feet high. The canes can be tied to both wires.

In case it is not possible to do much hoeing the cultivator can be used all summer, the dewberry plants may be set 5 feet apart in rows 5 feet apart. Then the cultivator can be run in both directions and it will help in keeping the suckers down. One hundred and seventy-six plants will be needed if the tenth acre is 30 feet wide by 145 feet long. If planted in this manner, each plant should have a stake beside it and the canes tied to the stake.

RASPBERRY GROWING.

Raspberries will not succeed well south of Kentucky and Virginia except in the hills and mountains of Tennessee, western North Carolina, northern Georgia, and northern Arkansas. They are a northern berry and succeed best in cool climates.

There are three classes of raspberry—the red, purple, and black raspberry. The red raspberry is the one most widely used both fresh and canned. The purple raspberry is not as attractive in appearance and is not used fresh as much as the red varieties. The purple varieties make good canning stock and are also used in drying. The black raspberry is used fresh, is canned, and is used more than the purple varieties for drying. The purple and black raspberries are not as erect growing as the red varieties and root at the tips of the canes. They do not send up suckers from their roots as the red varieties do.



FIG. 6.—Sample raspberry plants good for setting: Ranere (red) at the left, Columbian (purple) in the center, and Cumberland (black) at the right.

Starting the raspberry field.—The soil for the raspberry and the preparation of the soil are much the same as for the blackberry. Unless plenty of humus can be supplied to a sandy soil, it is better not to plant raspberries on that type.

Varieties.—The best variety of red raspberry for the South is probably the Cuthbert, and usually this should be planted. Some may wish berries before the Cuthbert ripens. Then plant the King, which bears much of its crop before the Cuthbert gets well started to ripen.

Cumberland and Farmer are the best black raspberry varieties to plant in the South. The Gregg is a later black raspberry and might be used to extend the season.

The Cardinal is the best purple raspberry if a purple variety is desired. In the mountain regions of West Virginia, Kentucky, Virginia, North Carolina, and Maryland the Royal Purple will be the best variety of this type to plant.

Selection of plants.—The same directions which were given for securing blackberry plants apply here. Watch for any of the knots on the roots, referred to under blackberries, and discard plants which have them. Healthy, vigorous

roots of the different types of raspberries suitable for planting are shown in figure 6. When plants received from the nursery can not be set immediately, they should be "heeled in" as illustrated in figure 1.

Planting.—Plant the raspberry just as the blackberry except for the distance between the rows. The plants should be set 3 feet apart in rows which are 6 feet apart. This means that you can set 240 raspberry plants on your tenth acre.

Fertilizers and intercrops.—The directions given for fertilizing and intercropping the blackberry apply to the raspberry.



FIG. 7.—A perfection red raspberry planted in accordance with the hill system. This plant has seven bearing canes, which are tied to a single stake. (Photographed at Milton, N. Y., June 18, 1915.)

Training.—It is just as important to keep all suckers out of a red raspberry patch as out of the blackberry field. If the plants were vigorous when they were set and the suckers have been kept down, by fall there should be at least three or four good strong canes from each hill.



FIG. 8.—A red raspberry plant having two strong canes and with a large number of suckers springing from the roots.

The red raspberry plant with several suckers which have grown from the roots is shown in figure 8. While this type of berry may be trained to trellises like those described under blackberries and one style of which is shown in figure 2, the plants are also grown in hills and the canes tied to posts as shown in figures 3 and 7.



FIG. 9.—A black raspberry plant with the laterals rooting at the tips. (See fig. 10.)

The black raspberry does not produce suckers. Because its canes grow so long, the ends of the young canes should be pinched when they are about 3 feet in length. This will make the canes branch as is shown in figure 9. The tops



FIG. 10.—The black raspberry plant shown in figure 9 after it had been pruned.

of the canes of the black varieties when they reach the ground and become covered with soil send out roots and in this way plants for setting new fields are obtained. Figure 9 shows the tips covered with soil, while the plant shown in figure 6 is one that has been formed by the rooting of a tip. The plant in figure 9 is shown in figure 10 after it has been pruned and the rooted tips removed. The canes are tied to a wire trellis as are the red raspberries. The purple raspberries are trained just as the black raspberries.

Diseases.—The raspberry has the “crown gall” just as the blackberry. The “rust” does not injure raspberries. “Anthracnose” is more serious on the raspberry than on the blackberry. This disease makes peculiar sunken, dead blotches on the canes. It will not be serious, however, if all of the canes which have borne berries are cut out as soon as picking is finished. Burn the old canes as soon as they are cut.



FIG. 11.—Waist and hand carriers. The waist carriers hold two cups or baskets and the hand carriers six.